

Baseline Data for Arabic Acquisition with Clinical Applications: Some Phonological Processes in Qatari Children's Speech

Dr. Haifa Al-Buainain

English Literature and linguistics
Qatar University
QATAR

Kimary Shain

Feda Al-Timimy

Qatar University

Ghada Khattab

University of Newcastle-upon Tyne, UK

ABSTRACT

This paper has two aims. The first is to inform our language acquisition colleagues about the "Baseline Data for Arabic Acquisition with Clinical Applications" project, which is a multi-institutional and international three-year interdisciplinary project in Linguistics and Children's Health. It is a cross-sectional study of children's speech that involves research on normal conversational interactions by native Arabic-speaking children between the ages of 1 year and 4 months and 3 years and 7 months. The goal is to collect extensive new material on four colloquial Arabic dialects: Qatari, Jordanian, Palestinian, and Lebanese.

The second aim is the presentation of some results about phonological processes observed in the speech of young Qatari children, based on the databases. The paper gives a small taste of the kind of data the Qatar team is encountering including a discussion of practical difficulties in doing the work. We hope this will be helpful for fellow researchers who do child language research in the Arab Gulf region.

Key words: First Language Acquisition, Phonological processes, Acquisition of Qatari Arabic

1. Introduction

Arabic is the mother tongue of 22 countries and has many different dialects. However, research on the child language development of Arabic is lacking. Qatari children's speech and language development as well as their phonological and morphological development have thus far been studied to a very limited extent. This limitation may be because Qatari Arabic is the native language of Qataris, a relatively small group compared with the hundreds of millions of people who speak, for example, English or French as their native tongue. The only studies of the acquisition of Qatari as a first language were published in 1999 and 2003 in English and in 2010 in Arabic by Haifa Al-Buainain. Therefore, this analysis would enrich universal knowledge about first language acquisition in general and knowledge of phonological development specifically.

This paper presents some linguistic and phonological processes observed in Qatari children's speech. The data are acquired from a recent large-scale study of Arabic first language acquisition, the Baseline Data for Arabic Acquisition with Clinical Applications project. Specifically, the project aims to create

four online bilingual Arabic-English resources: the Arabic Child Language Database, Analysis of the Arabic Child Language Database, Arabic Child Language Norms and Clinical Reference Materials for Arabic Speech-Language Pathology. The project will provide extensive material on four Arabic dialects. It will also provide previously nonexistent baseline data on first language acquisition of Arabic, which are critical for speech-language pathologists working with Arabic children; and for linguists conducting research on the nature of language and first language acquisition.

In this study, we focus on the Qatari child speech data. We are obtaining audio recordings of 30 minutes of spontaneous Arabic speech produced by 140 Qatari monolingual children in natural settings (e.g., homes and preschools). Field Research Assistants (FRA) produce digital files of the children's speech recordings and text file transcripts of the recordings. The data are analysed and coded in the CHILDES format (Mac. Whinney 2010).

2. Qatari Arabic Dialect

2.1. ARABIC DIGLOSSIA, TRIGLOSSIA OR A CONTINUUM?

"Arabic is one of the world's major languages, spoken in a broad belt extending from the Arabian Peninsula on to the Atlantic Ocean. It is the official language and the home language for over 280 million and 140 million people, respectively in Africa and Asia (including the Middle East). Arabic belongs to the Afro-Asiatic family, Semitic group, south-western subgroup (Arabian branch). With the rise of Islam as a dominant religion after AD 622, Arabic became the most widespread of the living Semitic languages" (http://mylanguages.org/learn_arabic.php).

Ferguson (1959) believes that Arabic constitutes a classic case of diglossia, which involves a highly divergent and often grammatically complex literary variety, usually older than the spoken variety, learned through formal education and used for formal, mostly written, purposes. Other scholars (Gaber, 1966; Chejne, 1969; Altoma, 1974; Mitchell, 1980 and Zughoul, 1980; Amayreh, 2003) categorise the language situation in the Arab world into three different norms of Arabic: Traditional Classical Arabic, Modern Standard Arabic/Educated Spoken Arabic and Different Arabic dialects/Colloquial Arabic.

Modern Standard Arabic (MSA), or Educated Spoken Arabic (ESA), is the written variety of the language. It is common to all literate Arabic speakers in the world and is used in the media, in literature, at school and for all literate activities. Its spoken form is almost exclusively used in electronic media. According to Holes (1995), MSA is a unified, codified, pan-Arab variety of Arabic and is the modern descendant of Classical Arabic. MSA/ESA is not the spoken language acquired by children. Arabic-speaking children acquire the local dialect at home and learn MSA/ESA in school.

However, some Arab grammarians and linguists believe that the situation of Arabic is not merely a diglossic or even triglossic situation but, as Bakalla (1984:87) states, "a spectrum or better still a continuum which has at one extreme the purest Classical Arabic and at the other, the purest type of colloquial Arabic".

2.2. Sound System of Qatari Arabic

Bukshaisha (1985) presented a synchronic descriptive analysis of the phonology and phonetics of Qatari Arabic. She provided rules that operate in the phonological system of the Qatari dialect.

- a. The syllable nucleus is always composed of a vowel, either short or long.
- b. The syllable always begins with a consonant.

- c. The syllable can be closed or open.
- d. The vowel can be preceded by one, two or three consonants and followed by zero, one, two or three consonants (ibid: 4).

The consonant system incorporates 29 consonant phonemes (Bukshaisha, 1985: 10). The vowel system contains 8 monophthongs, 3 short vowels and 5 long ones (p. 37).

2.3. Qatari Arabic Morphological Paradigms

The following tables present the morphological paradigms of Qatari Arabic.

Table (1) Subject-independent pronouns

	sg	pl
1	qqana	qqeḥna
2m	qqinte	qqintau
2f	qqintei	
3m	qqehwa/huw	qquhma/hum
3f	qqihya/hiy	

Table (2) Possessive/object-dependent pronouns

	sg	pl
1	for verbs: <i>-ni</i> for prepositions and nouns after a consonant: <i>-i</i> for prepositions and nouns after a vowel: <i>-i</i>	<i>-na/-ne</i>
2m	after a consonant: <i>-ik</i> after a vowel: <i>-k</i>	<i>kum</i>
f2f	after a consonant: <i>-iĉ</i> after a vowel: <i>-ĉ</i>	
3m	after a consonant: <i>-eh</i> after a vowel: <i>-h</i>	<i>-hom</i>
3f	<i>-haqq</i>	

Table (3) Imperfect conjugation of strong verbs (*qqaktib* 'write')

	sg	pl
1	<i>qqa-ktib</i>	<i>n-aktib</i>
2m	<i>t-aktib</i>	<i>t-aktib-uun</i>
2f	<i>t-iktib-iin</i>	--
3m	<i>y-aktib</i>	<i>y-aktib-uun</i>
3f	<i>t-aktib</i>	---

Table (4) Perfect conjugation of strong verbs (*katab* 'wrote')

	sg	pl
1	<i>kitab-t</i>	<i>kitab-na</i>
2m	<i>kitab-t</i>	<i>kitab-tu</i>
2f	<i>kitab-ti</i>	--
3m	<i>kitab</i>	<i>kitb-au</i>
3f	<i>qqiktib-at/kitb-at</i>	

Table (5) Conjugation of biliteral verbs (*hiṭṭ* 'put')

	imperfect		perfect	
	sg	pl	sg	pl
1	<i>qqa-hiṭṭ</i>	<i>qqin-hiṭṭ</i>	<i>ḥaṭṭ-ee-t</i>	<i>ḥaṭṭ-ee-na</i>
2m	<i>qqit-hiṭṭ</i>	<i>qqi-t-ḥiṭṭ-uun</i>	<i>ḥaṭṭ-ee-t</i>	<i>ḥaṭṭ-ee-tu</i>
2f	<i>qqit-hiṭṭ-iin</i>	--	<i>ḥaṭṭ-ee-ti</i>	-
3m	<i>qqiy-hiṭṭ</i>	<i>qqiy-ḥiṭṭ-uun</i>	<i>ḥaṭṭ</i>	<i>ḥaṭṭ-au</i>
3f	<i>qqi-t-ḥiṭṭ</i>	--	<i>ḥaṭṭ-at</i>	--
active participle: <i>ḥaṭṭ</i>				
passive participle: <i>maḥṭuuṭ</i>				

Table (6) Conjugation of initial weak verbs: primary a (*qqakil* 'eat')

	imperfect		perfect	
	sg	pl	sg	pl
1	<i>qq-akil</i>	<i>n-akil</i>	<i>kal-ee-t/kal-t</i>	<i>kal-ee-na/kal-na</i>
2m	<i>t-akil</i>	<i>t-akl-uun</i>	<i>kal-ee-t/kal-t</i>	<i>kal-ee-tu/kal-tu</i>
2f	<i>t-akl-iin</i>	--	<i>kal-ee-ti</i>	-
3m	<i>y-akil</i>	<i>y-akl-uun</i>	<i>kall</i>	<i>kal-au</i>
3f	<i>t-akil</i>	--	<i>kal-at</i>	-
active participle: <i>maakil</i>				
passive participle: <i>makuul</i>				

Table (7) Conjugation of initial weak verbs: primary w (*qqugaf* 'stand (up)')

	imperfect		perfect	
	sg	pl	sg	pl
1	<i>qqa-uugaf/</i>	<i>n-uugaf/</i>	<i>wagaf-t/</i>	<i>wagaf-na/</i>
	<i>qquugaf</i>	<i>qqin-waggif</i>	<i>wigaf-t</i>	<i>wigaf-na</i>
2m	<i>t-uugaf/</i>	<i>qqit-wafg-uun/</i>	<i>wagaf-t/</i>	<i>wagaf-tu/</i>
	<i>qqitwaggif</i>	<i>t-uguf-uun</i>	<i>wigaf-t</i>	<i>wigaf-tu</i>
2f	<i>qqit-wagf-iin/</i>	-	<i>wagaf-ti/</i>	--
	<i>t-uguf-iin</i>		<i>wigaf-ti</i>	
3m	<i>qqi-waggif/</i>	<i>qqi-wagf-uun/</i>	<i>waggaf/</i>	<i>waggif-au/</i>
	<i>y-uugaf</i>	<i>y-uguf-uun</i>	<i>wigaf</i>	<i>qquuguf-au</i>
3f	<i>t-uugaf/</i>	-	<i>wigf-at/</i>	--
	<i>qqit-waggif</i>		<i>qquuguf-at</i>	
active participle: <i>wagif</i>				
passive participle: <i>mawguuf/mawquuf</i>				

Table (8) Conjugation of medial weak verbs (*gum* 'get up')

	imperfect		perfect	
	sg	pl	sg	pl
1	<i>qqu-guum</i>	<i>qqin-guum</i>	<i>gum-t</i>	<i>gum-na</i>
2m	<i>qqit-guum</i>	<i>qqit-gum-uun</i>	<i>gum-t</i>	<i>gum-tu</i>
2f	<i>qqit-guum-in/ qqit-guum-ein</i>	--	<i>gum-ti</i>	--
3m	<i>qqi-guum</i>	<i>qqi-gum-uun</i>	<i>gaam</i>	<i>gaam-au</i>
3f	<i>qqit-guum</i>	--	<i>gaam-at</i>	

active participle: *gaiyim*

Table (9) Conjugation of final weak verbs

a. tertiary y (*qqinseqq* 'forget')

	imperfect		perfect	
	sg	pl	sg	pl
1	<i>qqa-nseqq</i>	<i>n-inseqq</i>	<i>nis-ee-t</i>	<i>nis-ee-na</i>
2m	<i>t-inseqq</i>	<i>t-ins-oon</i>	<i>nis-ee-t</i>	<i>nis-ii-tow</i>
2f	<i>t-ins-ein</i>		<i>nis-ee-ti</i>	
3m	<i>y-inseqq</i>	<i>y-ins-oon/ y-ins-uun</i>	<i>niseqq</i>	<i>nis-au</i>
3f	<i>t-inseqq</i>	---	<i>nis-at</i>	

active participle: *naasi*

passive participle: *mansi*

b. tertiary a (*qqabni* 'build')

	imperfect		perfect	
	sg	pl	sg	pl
1	<i>qq-a-bni</i>	<i>n-abnei</i>	<i>bin-ee-t</i>	<i>bin-ee-na</i>
2m	<i>t-abni</i>	<i>t-abn-uun</i>	<i>bin-ee-t</i>	<i>bin-ee-tu</i>
2f	<i>t-abn-iin</i>	-	<i>bin-ee-ti</i>	-
3m	<i>y-abni</i>	<i>y-abn-uun</i>	<i>binaqq</i>	<i>ban-au</i>
3f	<i>t-abni</i>		<i>bin-at</i>	

active participle: *bani*

passive participle: *mabni*

Table (10) Conjugation of double weak qqiji 'come'

	imperfect		perfect	
	sg	pl	sg	pl
1	<i>a-ji/a-yi</i>	<i>qqin-yi/n-iji</i>	<i>yii-t/jii-t</i>	<i>jii-na/yii-na</i>
2m	<i>qqít-y-i/ qqijji [qqijji]</i>	<i>qqit-y-uun/ qqit-j-uun</i>	<i>yii-t/jii-t</i>	<i>jei-t-u/ yei-t-au</i>
2f	<i>qqit-j-iin/ qqit-yiin</i>	-	<i>yii-t-i/jii-t-i</i>	
3m	<i>y-iji/qqeiyi</i>	<i>qqiy-uun/qqij-uun</i>	<i>yeqq/ jeqq</i>	<i>y-au/j-au</i>
3f	<i>t-iji/qqit-yi</i>	--	<i>jaa-t/yaa-t</i>	

active participle: *jaiy/yaiy*

Table (11) Conjugation of quadrilateral verbs (ḫarbiṭ 'confuse')

	imperfect		perfect	
	sg	pl	sg	pl
1	<i>qqa-ḫar buṭ</i>	<i>qqin-ḫar buṭ</i>	<i>ḫar baṭ-t ee-t</i>	<i>ḫar baṭ-na ḫar baṭ- ee-na</i>
2m	<i>qqit-ḫar buṭ</i>	<i>qqit-ḫar buṭ-uin</i>	<i>ḫar baṭ-t ee-t</i>	<i>ḫar baṭ-tu ḫar baṭ-eetu</i>
2f	<i>qqit-ḫar biṭ-iin</i>	-	<i>ḫar baṭ-t-i eet-i</i>	--
3m	<i>qqi-ḫar buṭ</i>	<i>qqi-ḫar buṭ-uun</i>	<i>ḫar baṭ</i>	<i>ḫar baṭ-tau</i>
3f	<i>qqit-ḫar buṭ</i>	--	<i>ḫar baṭ-at</i>	--

active participle: *mḫar buṭ*
 passive participle: *mḫar baṭ*

3. Data

The aim of the following sections is to provide a small sample of the type of data the Qatar team is encountering. We first summarise the progress towards accomplishing the aims of the project in Qatar as well as the problems and difficulties encountered and their solutions. We hope that this overview will be helpful for fellow researchers who perform child language research in the Arab Gulf region. In addition, we discuss and analyse some 'errors' and phonological processes found in the data.

3.1. Participants

The recorded children are selected solely because they are native speakers of the Qatari dialect and because they are between the ages of 1 year 4 months and 3 years 7 months. The sample size is 140 children: 20 children in 7 groups with half boys and half girls in each group, as shown in the table below.

	Age Group	Number of Children
1	1:4 - 1:7	10 boys and 10 girls
2	1:8– 1:11	10 boys and 10 girls
3	2:0 – 2:3	10 boys and 10 girls
4	2:4 -2:7	10 boys and 10 girls
5	2:8 - 2:11	10 boys and 10 girls
6	3:0 – 3:3	10 boys and 10 girls
7	3:4 – 3:7	10 boys and 10 girls

3.2. Method

In this section, we provide a brief explanation of the procedures used and summarise what the participants are required to do. Our recording occurs in a quiet room in the children’s private homes, their grandparents’ or uncle’s houses, or preschools or day care centres. We audio record conversational interaction for 30 minutes of usable child speech data, including spontaneous speech facilitated by the mother or the caregiver using soft toys, picture books or photos from their own albums. The goal is to use objects that the children normally use rather than something new. Although this process may result in data on mother-child interaction patterns, we avoid question-and-answer sessions between the child and mother. Therefore, we encourage natural interaction to include all styles, including the mother disciplining the child, playing with the child, and interacting while the mother and child are eating and while the mother is teaching various things. Each child wears a small wireless lavalier microphone clipped to the child’s clothing. The microphone is connected to an Edirol-09 digital audio recorder, which records to an SD card.

Each child participant has his or her hearing screened. Hearing and language development are related, and the project must record whether the child participants have normal hearing. The children’s hearing screening lasts 3-5 minutes.

Before any recording occurs, parental consent forms are signed by the children’s parents. In addition, a signed principal’s consent form is obtained from the principals of the preschools attended by the children. Each child is free to choose whether to be recorded and to have his or her hearing screened. There is no pressure on the child to continue in the study even after enrolment. Each child and/or his or her parent or guardian is free to withdraw from the study at any time with no disadvantageous effects. This study involves no risks or physiological, psychological or social discomforts for the participants. For each child, the speech recording and hearing screening is stopped if the child shows reluctance to have the speech recording or hearing screening performed. Participants in this study are free to contact the investigators at any time during the study and after termination of the study. This project received ethical clearance from the Qatar University Institutional Review Board (QUIRB) and the Qatar National Research Fund (QNRF).

After recording, the children's audio data are saved on a computer, and transcripts are made of the recorded speech. Linguistic analysis of the transcripts is conducted to identify the patterns of linguistic structures in the children's data to determine how Arabic children acquire language and to gain knowledge on language acquisition in general. In the future, the child speech data and the results of the study will be made available on the project's website, as mandated by our research design and our open philosophy.

3.3. Problems

The project has experienced difficulties with hearing screenings, payment to the children/guardians, location of child subjects, permission from Qatar authorities, clarification of 'Qatari Arabic' as one dialect or a dialect group, bilingualism among Qatari children and Challenges encountered by the Field Research Assistant (FRA).

3.3.1. Hearing Screenings

Our research design includes a hearing screening for each child participant. However, Qataris did not agree to have their children's hearing screenings performed at a clinic. Therefore, the alternative is to perform the hearing screenings at homes or preschools using a portable audiometer. However, a comprehensive search in consultation with the Medical Research Centre (HMC) Audiology Department and audiologists at Doha Clinic Hospital and the Magrabi Doha Center's Audiology Unit revealed that no portable audiometer is available to borrow or rent in Qatar. This obstacle has forced the Qatar team to pursue buying an audiometer and, in the meantime, to rely on professionally acceptable parental reports about hearing level and middle ear function.

3.3.2. Finding parents and families

Finding children to participate has been a significant challenge. Many families want to help, but without having their children recorded. Participants have been identified through social networking (Milroy 1987) and are either friends' children or the children of friends of friends. We have also contacted different nurseries, and we have asked university students in different classes if they have siblings or other relatives who are within the age groups of our study and who might be able to participate. We have posted ads on the University Forum in Arabic and English, on Facebook and on Qatar Living. When participants are identified, contact details are gathered, and the Fieldwork Research Assistant (FRA) arranges the meeting.

3.3.3. Varieties of the Qatari dialect

We are recording Qatari children who speak the Qatari dialect. However, there are some differences due to geographical, religious and social status (Al-Amadidhi, 1985).

3.3.4. Concentrating on monolingual children

Most Qatari children (within the project age range) are bilingual because they attend English nurseries and schools. However, we concentrate only on children who attend Arabic nurseries. The children we record include those who might know some English but for whom Arabic is dominant because the focus of the study is on the first language acquisition of Arabic. This restriction on our child subjects has increased the challenges involved in achieving the required sample size for our Qatari data. We aim to include children who speak no more than 30% English in their speech recordings.

4. Analysis

4.1. Phonological Processes

Some phonological processes were evident in our preliminary phonological analysis of Qatari children's speech. According to (Stampe, 1979:1), a phonological process is "[...] a mental operation that applies in speech to substitute for a class of sounds or sound sequences presenting a common difficulty to the speech capacity of the individual, an alternative class identical but lacking the difficult property". Phonological processes describe the systemic errors that children produce to simplify the phonological system of adults (Stoel-Gammon and Dunn, 1985). These simplifications are not random but predictable" (Williamson, 2008). Phonological development is a dynamic process that operates on three levels: universal development, specific language development, and specific child development. An intricate relationship between the three factors reflects the acquisition of each child's phonemic inventory (Saleh et al. 2007: 234).

Three main types of phonological processes (Ingram, 1989; Stampe, 1973) have been noted in our preliminary analysis of the speech of Qatari children: substitution processes, assimilation and syllable structure processes. These *natural processes* (Gammon and Dunn, 1985) are present not only in the speech of Arabic-speaking children but also in the speech of children who speak other languages, such as English, German, Cantonese, Maltese and Turkish (Stoel-Gammon and Sosa, 2009, Zhu Hua and Dodd, 2006).

Processes that rarely occur are called *unusual or idiosyncratic processes* (Gammon and Dunn 1985). Usually, more than one process occurs in the same word (Lowe, 1994). Thus, Williamson (2008) states that phonological processes "do not always operate in isolation from other processes, or from different presentations of the same process. For example, the process of stopping does not have to operate exclusively in either initial position (e.g., foot being said as toot) or final position (e.g., bash being said as bat): it may operate in both positions at the same time. [...] It is also possible to have several processes affecting speech production at any one time".

The rate at which phonological processes are suppressed varies between children; however, the greatest rate of process suppression occurs between 2.6 and 4 years of age (Robert 1990). Recently, Shahin et al. (2012) reported on the occurrence of error types for 100 children from a total 14,562 error tokens. The children included 5 boys and 5 girls in each of three age groups for Qatari and Palestinian Arabic (1;4-1;7; 1;8-1;11; 2;0-2;3) and two age groups for Jordanian and Lebanese (1;4-1;7; 1;8-1;11).

Figure (1) shows the percentage of occurrence of each error type by age group for the Qatari dialect.

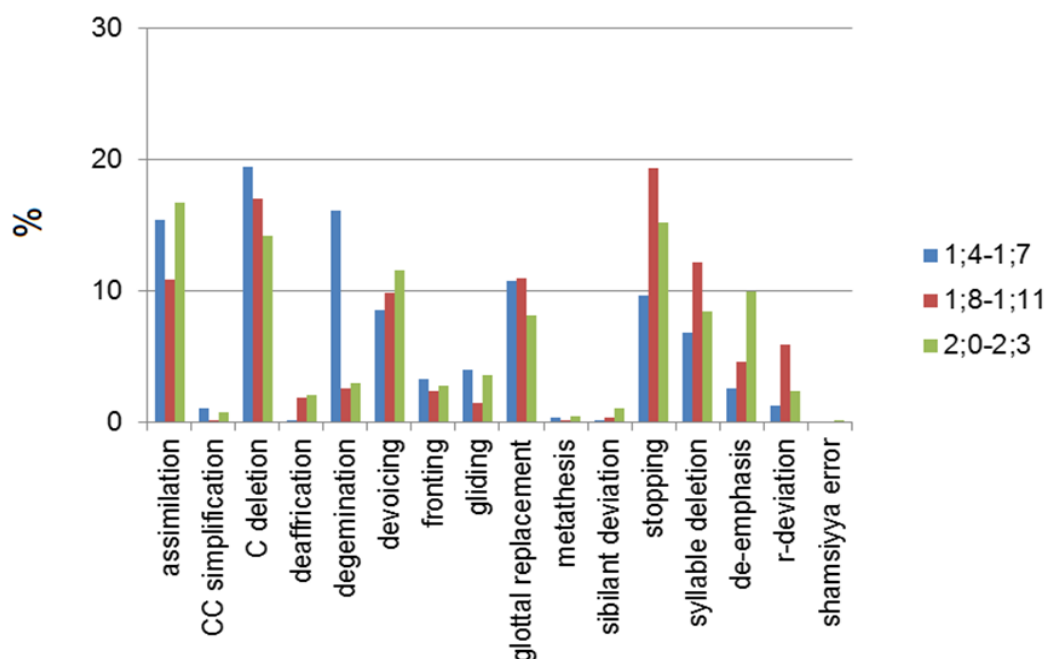


Figure 1. Qatari Arabic occurrence of error types

According to Shain et al. (2012), the Qatari data exhibit degemination and glottal replacement declining in occurrence by age 1;11 with increasing *r*-deviation and *shamsiyya* errors. Lexical and phrasal targets in the data indicate that *r*-deviation increases as the children's growing vocabularies cause them to confront more *rs* in target words. The trill *r* is acquired late in Arabic. The rise in *shamsiyya* errors correlates with the increased occurrence of targeted definite NPs as the children move beyond Stage 1 (Brown 1973) (two-word sentences).

The researchers concluded, "For all dialects and age groups, most errors are assimilation, C deletion, devoicing, glottal replacement, stopping, syllable deletion and de-emphasis. The prevalence of glottal replacement matches the findings of Saleh et al. (2007) and others" (Shain et al., 2012).

4.1.1. Systemic Simplifications

These phonological processes systematically vary a particular type of speech sound and replace it with another speech sound. The two main categories are substitutions and assimilations (Williamson, 2008).

4.1.1.1. Substitution Processes

This type of variation refers to processes in which one sound is replaced by another sound (Stoel Gammon and Dunn, 1985). Many different types of substitutions can be made in typically developing speech. Subtypes include lateralisation, stopping, fronting and gliding (Williamson, 2008). We provide selected examples to illustrate how phonological processes operate. The following types are examples of substitution processes observed in Qatari children's speech.

/r/ Deviation: In this process, /r/ may be replaced by /l/, a vowel, or a glide. In addition, it might be deleted or assimilated (Ammar and Morsi, 2006).

Example (1): (Boy, Age: 3;1): [l] → [j] [saleħ] → [sajeh] 'Boy's name' (gliding)

Example (2): (Boy, Age: 3;1): [r] → [j] [ʔæzræɟ] → [ʔæzjæɟ] 'blue' (gliding)

Example (3): (Girl, Age: 2;1): [r] → [l] [tiarti] → [tialti] 'my plane' (lateralisation) Example (4): (Boy, Age: 2;11): [r] → [l] [raaħ] → [laaħ] '(he) went' (lateralisation)
 Example (5): (Girl, Age: 1;7): [r] → [n] [noor] → [noon] 'Girl's name'
 Example (6): (Boy, Age: 2;10): [r] → [l] [reely] → [leely] 'my foot' (lateralisation)
 Example (7): (Boy, Age: 3;00): [r] → [u] [gurfah] → [guffah] 'room'
 Example (8): (Boy, Age: 3;00): [r] → [l] [serwaal] → [selwaal] 'pants' (lateralisation)
 Example (9): (Girl, Age: 3;2): [r] → [l] [ræs] → [læs] 'head' (lateralisation)
 Example (10): (Girl, Age: 2;10): [r] → [l] [makaroonh] → [makaloonh] "macaroni" (lateralisation)

a) Sibilant Deviation: This process may take several forms. For example, sibilants may be substituted by interdental or dental/alveolar stops (Al-Buainain, 2003; Ammar and Morsi, 2006).

Example (11) : (Boy, Age: 3;1): [d] → [t] [ʔæsæd] → [ʔæθæt] 'lion'
 Example (12): (Girl, Age: 3;5): [s] → [θ] [ʔæseer] → [ʔæθeer] 'juice'

b) Glottal Replacement: The child substitutes the fricatives and plosives with a glottal stop (Ammar, 1992).

Example (13): (Girl, Age: 2;2): [ʕ] → [ʔ] [ʕenæb] → [ʔænæm] 'grapes'
 Example (14): Child (Girl, Age: 3;2): [ʕ] → [ʔ] [ʕatini] → [ʔatini] 'give me'
 Example (15): Child (Girl, Age: 2;2): [ʕ] → [ʔ] [ʕæseer] → [ʔæθeer] 'juice'

d) Fronting: Fronting occurs when any consonant that is made posterior to the alveolar ridge is substituted by another consonant that is made at or in front of the alveolar ridge. Fronting is often widespread in children from the age of 2;00 years to as old as 4;06 years (Williamson, 2008). Below are some examples from the Qatari data:

Example (14): (Girl, Age: 3;1): [k] → [t] [kaf] → [taf] 'slap' (velar fronting)
 Example (15): (Boy, Age: 3;1): [k] → [t] [koureh] → [touleh] 'ball'
 The above example (15) demonstrates "multiple processes" (1) (velar fronting) and (2) lateralisation [r] → [l] [koureh] → [touleh]
 Example (16): (Boy, Age: 3;00): [g] → [d] [gaal] → [daal] 'he said'
 Example (17): (Boy, Age: 3;5): [ʃh] → [s] [ʃhaʕar] → [saʔl] 'hair' (palatal fronting)
 The above example (17) demonstrates "multiple processes" (1) palatal fronting and (2) glottal replacement [ʕ] → [ʔ] [ʃhaʕar] → [saʔl]
 Example (18): (Girl, Age: 2;10): [k] → [t] [kersi] → [tersi] 'chair' (velar fronting)
 Example (19): (Girl, Age: 3;2): [ʃh] → [s] [ʃheixah] → [seixah] 'girl's name' (palatal fronting)
 Example (20): (Boy, Age: 3;1): [ʃh] → [s] [meshʕal] → [mesʔal] 'boy's name' (palatal fronting)
 The above example (20) demonstrates "multiple processes" (1) palatal fronting and (2) glottal replacement [ʕ] → [ʔ] [meshʕal] → [mesʔal]
 Example (21): (Boy, Age: 2;5): [ʃh] → [s] [aʃway] → [asway] 'little' (palatal fronting)
 Example (22): (Girl, Age: 2;7): [ʃh] → [s] [ʃheel] → [seel] 'you carry' (palatal fronting)
 Example (23): (Girl, Age: 2;9): [ʃh] → [s] [aʃeel] → [aseel] 'I carry' (palatal fronting)
 Example (24): (Girl, Age: 2;8): [ʃh] → [s] [meshe6] → [mese6] 'brush' (palatal fronting)

e) Backing: According to Williamson (2008), "Backing occurs whenever a non-velar or non-glottal consonant (i.e., a bilabial, labio-dental, dental, alveolar, post-alveolar or palatal consonant) is substituted with a velar /k g ŋ/ or glottal /h ʔ/consonant. For example, bun may be said as gun. Here, the front sound 'b' (usually made with the two lips coming together) is substituted with the back sound 'g' (made with the back of the tongue lifting towards the back of the mouth). Other examples include *door* being said as *goor*, and *tar* being said as *car*. Backing is frequently observed as a typical process in children from 2;00-3;00 years of age".

The following example is taken from a Qatari girl:
 Example (25): (Girl, Age: 2;2): [f] → [g] [foug] → [goug] 'up'

f) Stopping: "Stopping occurs when continuant consonants (nasals, fricatives, affricates and approximants) are substituted with a stop consonant /p b t d k g ʔ/. A fricative consonant (/f/ /v/ /s/ /z/, 'sh', 'zh', 'th' or /h/) or an affricate consonant ('ch' or /j/) is replaced by a stop consonant (/p/ /b/ /t/ /d/ /k/ or /g/). In these examples, /f/ in "funny" is replaced by /p/, and 'j' in "jump" is replaced by /d/. Depending on which sustainable speech sound is stopped, this process appears in the speech of typically developing children from 2;00-4;06 years of age" (Williamson, 2008). The following examples acquired from the Qatari data illustrate this phonological process.

Example (26): (Boy, Age: 2;11): [s] → [t] [asoog] → [atoog] 'the market'

Example (27): (Boy, Age: 3;5): [j] → [d] [jawaal] → [dawaal] 'mobile'

Example (28): (Girl, Age: 2;2): [j] → [d] [jadah] → [dadah] 'grandmother'

Example (29): (Boy, Age: 3;00): [j] → [d] [jooty] → [dooty] 'shoes'

4.1.1.2. Assimilation Processes

Assimilation is "the process whereby a feature of one sound becomes part of another during speech production" (Yule, 2010:283). Assimilation may be complete or partial, and it may be progressive or regressive. Assimilation occurs when one speech segment is transformed into another because of the influence of a neighbouring segment (Steol-Gammon and Dunn, 1985).

Word-final de-voicing: In this process, a voiced consonant becomes voiceless (Ammar and Morsi, 2006). The following examples were acquired from the Qatari data.

Example (30): (Girl, Age: 2;2): [b] → [m] [ʕənæb] → [ʔænæm] 'grapes' (multiple processes)

Example (31): (Boy, Age: 2;5): [d] → [t] [ʔæsæd] → [ʔææt] 'lion'

Example (32): (Girl, Age: 3;00): [d] → [t] [ʕanood] → [ʕnoot] 'girl's name'

a) Consonant / Vowel harmony: This process occurs when an earlier sound influences a later one, or vice versa, such that both are produced at a similar place of articulation (i.e., "lellow" for "yellow"). The pronunciation of the whole word is influenced by the presence of a particular sound in the word (Williamson, 2008).

The following examples acquired from the Qatari data illustrate this phonological process.

Example (33): (Girl, Age: 2;8): [ħalaawh] → [waa woh] 'sweet'

Example (34): (Boy, Age: 3;7): [jawaal] → [wawaal] 'mobile'

Example (35): (Girl, Age: 2;2): [dabdob] → [dobdob] 'bear' (**Vowel harmony**)

Example (36): (Girl, Age: 3;2): [baʔaaryah] → [batatyah] 'battery'

Example (37): (Boy, Age: 3;4): [manaker] → [manatel] 'nail polish'

Example (38): (Boy, Age: 3;3): [lazga] → [lasaga] 'plaster'

Example (39): (Girl, Age: 2;7): [labtob] → [baatob] 'laptop'

Example (40): (boy, Age: 3;1): [hamtarw] → [mantarwtarw] 'name of a character in children's animation'

Example (41): (Girl, Age: 2;9): [zаноobah] → [boobh] 'slipper'

4.1.2. Structural Simplifications

This type of phonological process occurs where the syllabic structure of the word is modified. It refers to sound changes that cause sounds or syllables to be reduced in number, deleted or repeated. Cluster reduction, deletion, weak syllable deletion, and reduplication are subtypes of this process (Steol-Gammon and Dunn, 1985).

a) Consonant Cluster Simplification: Cluster reduction occurs when one or more consonants in a cluster are omitted. This process has several forms, such as reduction of the cluster and cluster assimilation (Ingram, 1989:372). Cluster reduction is often observed in children between 2;00 and 3;06 years of age (Williamson, 2008).

The following example is taken from a Qatari boy:

Example (42): (Boy, Age: 2;8): [l] → [0] [kælb] → [kæpph] 'dog' (the devoicing process also occurs)

b) Deletion: A simple approach to alter the structure of a word is to omit particular speech segments. Two main speech segments are typically deleted: (i) consonants and (ii) weak syllables.

i) Consonant deletion: Consonant deletion occurs whenever a consonant in a (a) syllable-initial or (b) syllable-final position is omitted. Children may delete sounds at the beginning of words (initial consonant deletion), e.g., "cat" becomes "at", "boat" becomes "oat", or "house" becomes "ouse", or at the ends of words (final consonant deletion), e.g., lid becomes li, cup becomes cu. Consonant deletion is a typical phonological process for children between the ages of 2;00 and 3;06 years (Williamson, 2008).

The following examples acquired from the Qatari data illustrate this phonological process.

Example (43): (Girl, Age: 2;2): [kali] → [ali] 'uncle'

Example (44): (Boy, Age: 2;4): [kalid] → [alid] 'boy's name'

Example (45): (Boy, Age: 1;10): [sauod] → [ood] 'boy's name'

Example (46): (Girl, Age: 2;9): [sinbad] → [inbad] 'Sinbad'

Example (47): (Girl, Age: 1;8): [samposa] → [pota] 'samosa' (multiple processes)

Example (48): (Girl, Age: 2;2): [baṭaaryah] → [bata] 'battery' (multiple processes)

Example (49): (Girl, Age: 4;2): [ma agedr] → [ma del] 'I can't' (multiple processes)

Example (50): (Girl, Age: 2;11): [ṡyoni] → [yoni] 'my eyes'

Example (51): (Girl, Age: 2;11): [kourah] → [koeh] 'ball'

ii) Weak syllable deletion: Weak syllable deletion occurs when the unstressed or weak syllable of a multi-syllabic word is omitted. In this process, whole syllables are deleted. These syllables are typically unstressed syllables (e.g., the 'ba' in banana; the 'to' in octopus). For example, banana may become nana, octopus may become ocpus, and "tidying" is pronounced as "tying". Syllables are either stressed or unstressed. In "telephone" and "tidying", the second syllable is "weak" or unstressed. In this phonological process, weak syllables are omitted when the child says the word. This is a typical process in children between the ages of 2;00 and 4;00 years (Williamson, 2008).

The following examples acquired from the Qatari data illustrate this process.

Example (52): (Girl, Age: 3;7): [telefoon] → [foon] 'telephone'

Example (53): (Boy, Age: 2;7): [telefezyoon] → [zyoon] 'television'

Example (54): (Girl, Age: 2;11): [kombeuter] → [cobtr] 'computer'

Example (55): (Girl, Age: 3;5): [bertaqaal] → [qaal] 'oranges'

Example (56): (Girl, Age: 2;5): [mama] → [ma] 'mother'

Example (57): (Girl, Age: 2;5): [afluus]] [luus] 'money'

Example (58): (Girl, Age: 2;5): [kaboos]] [boos] 'hat'

Example (59): (Girl, Age: 2;5): [baṭaṭes]] [tates] 'potatoes' (multiple processes)

Example (60): (Girl, Age: 2;5): [shukalaṭa]] [lata] 'chocolate' (multiple processes)

c) Metathesis: Metathesis occurs when two consonants within a syllable are placed in a different order. A reordering of the sequence of consonants (C) and vowels (V) occurs within a syllable. For example, in a CVC sequence, the first and last consonants may be reversed, e.g., cup becomes puc (Williamson, 2008).

Example (61): (Boy, Age: 3;6): [ytzahlgon] → [yzalhago] 'they are tobogganing'

Example (62): (Girl, Age: 3;2): [gabgab] → [begbeg] 'crab'

Example (63): (Girl, Age: 2;9): [abreṡsy] → [arbeṡsy] 'lizard'

Example (64): (Boy, Age: 2;9): [ṡmaat] → [mṡaat] 'tomatoes'

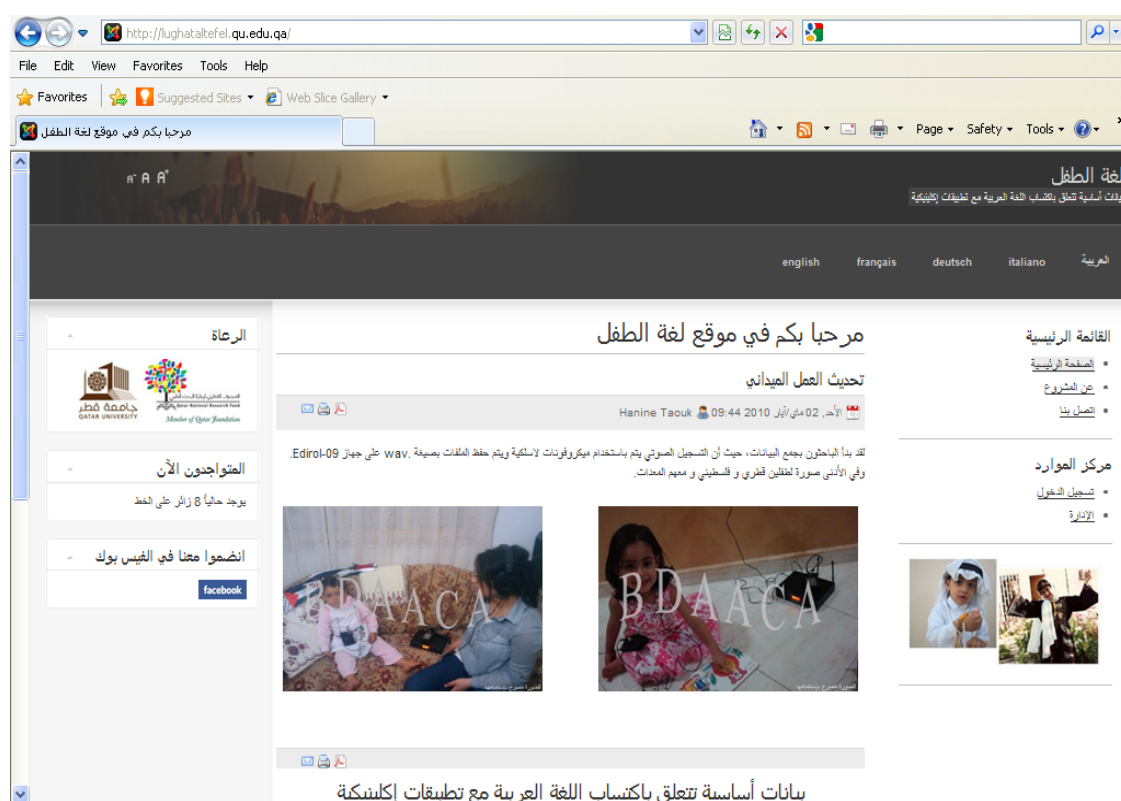
Example (65): (Girl, Age: 2;10): [ṡaawleh] → [ṡalwh] 'table'

5. Summary and Conclusions

The aim of this study was to highlight some examples of the phonological process that are common in the speech of Qatari children from 1 year and 4 months to 3 years and 7 months old. This study contributes an extensive amount of information on the phonological development of a rarely studied language, namely Qatari. The results of the current study suggest that the speech of Qatari children exhibits various phonological processes similar to those observed in other studies (Al-Buainain, 1999, 2003; Amayreh and Dyson, 2000, Saleh et al., 2007). The most commonly occurring phonological processes are cluster reduction, final consonant deletion, substitution, and assimilation.

6. Where to find the project

- <http://lughataltefel.qu.edu.qa/>
- a centralised work hub, public face, and portal for interaction



References

- Al-Amadidhi, D. (1985). Lexical and Sociolinguistic variation in Qatari Arabic. Ph.D. Thesis. Linguistic Department. University of Edinburgh.
- Al-Buainain, H. (1999). "Creativity/ Productivity of Child's Language: a Case study of Qatari Dialect", *Bulletin of the Documentation and Humanities Research Centre*, Vol. (1999) (pp.7-26) Qatar.

- Al-Buainain, H. (2003). "Developmental stages of the acquisition of negation and interrogation by children native speakers of Qatari dialect". *Journal of the Faculty of Humanities and Social Science* 25:9-45.
- Al-Buainain, H. (2010). *Creativity and Innovation of Child's Language: a field study of Child's Acquisition of Qatari Arabic*. (in Arabic). The Ministry of Culture, Arts and Heritage. Doha, Qatar.
- Altoma, S.(1974). "Language education in Arab countries and the role of the academies". In Fishman, J. (ed.) (1974). *Advances in Language planning*. The Hague: Mouton.
- Amayreh, M. (2003). Completion of the Consonant Inventory of Arabic. *Journal of Speech, Language, and Hearing Research*, 46, 517-529.
- Amayreh MM, Dyson AT (1998). The acquisition of Arabic consonants. *J Speech Lang Hear Res.*; 41: 642–653.
- Amayreh MM, Dyson AT (2000). Phonetic inventories of young Arabic- speaking children. *Clinical linguistics and phonetics.*; 41: 642–653.
- Ammar, W. (1992). *Articulation Disorders in Arabic*. Unpublished PhD Thesis, University of Alexandria, Egypt.
- Ammar, W. and Morsi, R. (2006). "Phonological Development and Disorders: Colloquial Egyptian Arabic". In Zhu Hua and B. Dodd (Eds), *Phonological Development and Disorders in Children: A Multilingual Perspective* (pp. 204-232). Multilingual Matters Ltd.
- Bakalla, M. H. (1984). *Arabic Culture through its Language and literature*. Kegan Paul International.
- Bowen, C. (1998). *Typical Speech Development: the Gradual Acquisition of the Speech Sound System*. Retrieved from <http://www.speech-language-therapy.com/acquisition.html> on (1/9/2012).
- Brown, R. (1973). *A first language : the early stages*. Cambridge.
- Bukshaisha, F. A. (1985). *An Experimental Phonetic Study of Some Aspects of Qatar Arabic*. Ph. D. Thesis. University of Edinburgh. Britain.
- Chejne, A. (1969). *The Arabic Language*. The University Minnesota Press.
- Ferguson, C. A. (1959). "Diglossia". *Word*. 15:265-89.
- Gaber, A. M. (1966). *Syllabic Structure in MSA and CEA*. Master Thesis of Applied Linguistics. Department of Linguistics, Brown University Providence, Rhode Island, U.S.
- Holes, C. (1995). *Modern Arabic: Structures, Functions and varieties*. London. Longman.
- Ingram, D. (1989). *First language Acquisition : Method, Description and Explanation*. Cambridge university press.
- Ingram D: *Phonological Disability in Children*, ed 2. London, Whurr, 1989.

- Lowe, R. (1994). *Phonology: Assessment and Intervention Applications in Speech Pathology*. Baltimore. Maryland: Williams and Wilkins.
- MacWhinney, B. (2010). *The CHILDES Project. Tools for Analysing Talk – Electronic Edition. Part 1: The CHAT Transcription Format. And Part 2: The CLAN Programs*. Carnegie Mellon University. Available online at <http://childes.psy.cmu.edu/manuals/clan.pdf>.
- Milroy, Lesley, (1987) (2nd ed.) . *Language and social networks*,. Oxford: Blackwell.
- Mitcell,T.F. (1980). "Dimensions of style in a grammar of educated spoken Arabic". *Archivum Linguisticum*. (new series) 2:89-105.
- Robert J, Burchinal M, Foote M (1990). Phonological process decline from 2 1/2 to 8 years. *J Commun Disord*;23:205–217.
- Saleh, M, Shoeib R, Hegazi M, et al. (2007). Early phonological development in Arabic Egyptian children: 12-30 months.
- Shahin, K. R. Morsi, G.Khattab and H. Al-Buainain (2012). "Some phonological norms for developmental Arabic". 2012 International Child Phonology Conference. 4 June 2012 - USA.
- Stampe,D. (1979) *The Acquisition of Phonetic Representation in Aspects of Phonological Acquisition*, In Ingram, D. (Ed) 1989. *Phonological Disability in children*. London.
- Stole-Gammon, C. and Dunn, C. (1985). *Normal and Disordered Phonology in Children*. Austin: Pro-ed.
- Stole-Gammon, C. and Sosa, A. V. (2009). "Phonological Development". In Erika Hoff and M. Shatz (eds). *Language Development*. (pp. 238-256)Wiley-Blackwell.
- Super Duper Publications (2004). http://www.superduperinc.com/handouts/pdf/66_Phonological.pdf
- Williamson, G. (2008). *Phonological Processes*.
- Yule, G. (2010) (4th ed). *The Study of Language*. Cambridge university press.